

Field Stations

JR-1978-1979-1980-
1981

7530-00-222-3521

FEDERAL SUPPLY SERVICE

(GPO)

.87

J. ROSEWATER

Smithsonian

Institution

Child's Play

egon

Field Station, Oregon
Dept Invert Zool Mexico

Date _____

Field No. _____

Time _____

Sta No. _____

Coll by _____

Lab Log _____

Chart _____

Locality _____

Ecol. Habitat _____

Vegetation _____

Bottom _____

Type Shore _____

Dist. shore _____

Type Shore _____

Salinity _____

Water Temp _____

Turbidity _____

Current _____

Tide _____

Depth water _____

Depth capture _____

Method capture _____

Preserve live _____

Photographs _____

General notes _____

Field Data Record
Dept Invent Zool

Date _____

Field No. _____

Time _____

Sta No. _____

Coll by _____

Lab Log _____

Chart _____

Locality _____

Ecol. Habitat _____

vegetation _____

Bottom _____

Type shore _____

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Dist. shore _____

Water Temp _____

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Turbidity _____

Current _____

Tide _____

Depth water _____

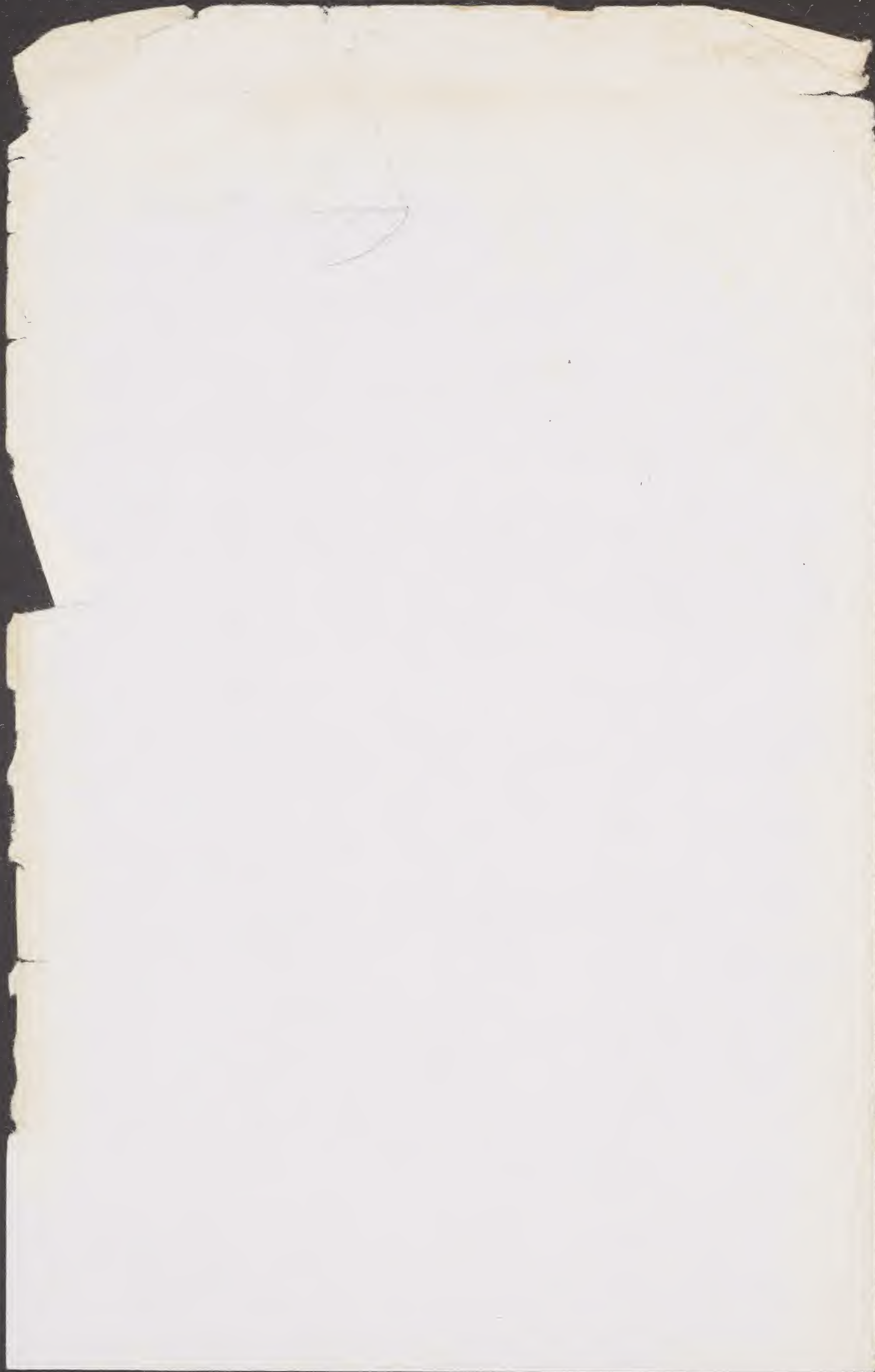
Depth capture _____

Method capture _____

Where live _____

Photographs _____

General notes _____



Trip To Washington, Oregon
California and Mexico

June 1978 - M & J Rosewater
(arrived at 11:40 AM.)

IR-1-78 - June 11, 1978 - 1:00 PM
(Low tide 0.8 ft. at 1:16) Cobble
Beach - mostly small ^{smooth} stones - few large
boulders. Lincoln Park, Seattle, WA.
Littorina scutulata and L. sitchana
on and under cobbles evenly distributed
over beach. Gently sloping shore -
even gradient, uncovered by low tide.
Film Photos taken here, at Alki pt. (no
Littorina), on Ferry betw. Seattle &
Winslow and at Port Townsend thru #30
Ecology of these two Littorinas differs
markedly from New England species which
appear more limited to specific areas rather
than being distributed evenly over shore.

June 12, 1978 JR-2-78

8:00 A.M. Port Townsend, WA., $\frac{1}{2}$ mi. S.
of town opposite Port Townsend Motel, off of
State Route 20, at Mouth of Puget Sound
where it flows into Str. of Juan de Fuca.

High Tide at 7:14 A.M. - Tide dropping. Littorina
scutulata + L. sitchana on and under cobbles
and boulders and sea weeds - light colored sitchana
and larger sized seem to be appearing as
water dropped. Collected from about 7:30 -

8:30 A.M. Water temp 14°C , Salinity 27‰

Film #1, frames 31, 32 shore with wharf +
dock + gulls, + semi vertical view of beach
with cobbles + boulders.

#33 View of Mountain in Olympic range
from Sequim, WA. + 34

June 12, 1978

JR-3-78

12:30 P.M. Sekiu, WA. on Strait
of Juan De Fuca, about 18 mi
ES E. of Neah Bay. *Littorina sitchoua*
& some *L. scutulata* from breakwater
rocks - snails on seaweed (*sitchoua*
on "Fucus" (?) (like *hobtusata*) larger
in size than seen before. Low tide
was about 11:15 A.M. Temp. ca 18°C,
Salinity 28‰, Kodachrome film #1, #35

June 12, 1978

JR-4-78

1:30 P.M. about 4-5 miles west
of Sekiu, WA - Point with large
boulders - moderate low Tide - filling
large *Littorina sitchoua* on rocks - in
mid intertidal - Kodachrome - roll 1,
Nos 36-37 taken of pillar & Vancouver
across strait with Mary in both.

June 12, 1978

JR-5-78

2:45 P.M. Neah Bay, WA. - Rock shore
west side, *Littorina* from "Fucus". Salinity 26‰
Temp. 18°C. - Kodachrome Roll 2 - 1-15 ?
Freshwater stream entering at head of bay, or less?

June 13 Kodachrome Roll 2 - frames 16 - 18⁺
between Ruby Beach + Kalalook, Olympic
National Park, Pacific coast area. - Beach,
surf, timber, road with regrowth after
burn?

June 13, 1978 JR-6-78

Rock-Revetment + Groin Point Chehalis,
Westport, WA. 10:30 AM (low tide
at about 12:00 N. Littorina scutulata
(only) from rocks among barnacles
+ algae R2 - fr. 19-21 of site +
sign

June 13, 1978 JR-7-78

Salt (Salicornia) Marsh - $\frac{1}{4}$ mile west
of Elk R Bridge. Few "Alexia"
at bases of plants in mud. No
Littorina - Kodachrome # 22 taken
of Marsh with Westport in
far distance. Salinity 16‰,
Temp. 20°C 12 Noon - 1230

June 13, 1978

JR-8-78

AT EIK R Bridge (inside) Route
105 near Westport, WA. from edge
of tidal River channel, Salicornia
marsh, with "Fucus" at margin near
~~tidal~~ channel. Littorina + eggs
from on + under "Fucus" + on
mud beneath. Salinity 16‰. Littorina
may be lowered salinity form of
L. sitkana? 1230 pm - 1.30 pm
Kodachrome #23, 24, 25 - views
of Bridge + salicornia/fucus flat

June 13, 1978

JR-9-78

about 6 mi N.E. of Ilwaco on
Willapa Bay, off Route 101.
Littorina associated with "Fucus" -
living on + eggs on, attached
to stones at margin of bay.
Photo # 26 of stony beach.

?
Kodachrome 27, 28 - View of ^{ocean} Coast from
High Point State Plk (?) looking down
on Mangroves + beach, 0

June 14 1978 - #29 View from Cape Meares St
Plk - High tide, tide

number circled = negative
collection station

June 14, 1978

JR - (10) - 78

9:45 AM

Outer side of Tillamook Bay, Oregon
west of Bay City - between T- +
Cape Meares. Rocks, muddy shore
with Fucus patches, sparse Salicornia
No Littorina - salinity 1‰ Tillamook
River influence - at crotch of jetty

June 14, 1978

JR - (11) - 78

9:00 AM.

Cape Meares, Oregon - outer coast
lucy beach (can stroke the
cobble - got out) No Littorina.
Goose Barnacles + By the Wind Sails
or Physalis about 2" (purple) -
seen on beach.

June 14, 1978

JR - 12 - 78

10:15 AM

Outer side of Tillamook Bay, Oregon
near JR-10, 1978 about $\frac{1}{4}$
mile out on jetty - rocks, boulders
with Fucus - L. "itchana" + eggs
(low salinity form) fairly lg. specimens
in good quantity - salinity 0‰!?
few blue mussels, sponges, dead Mya

Kodachrome 30 - 31 Tillamook
Bay view of Tillamook (town) with collecting area in
foreground

June 14 1978

JR-13-78

Netarts

Netarts, Oregon at Bay - ^{shore} side
Rocky fill shore - *Littorina scutulata*
on & under rocks - sample taken
Salinity 15‰ Temp 15°C [large
spec. inhibited by hermit crab - smaller
spec are alive!]

June 14, 1978

Kodach #2 frame 32, 33 - from
Anderson's Look out point - North showing
Netart Bay & the ocean coast looking
up toward Cape Meares & showing
"3 arch Rocks" islands - Nat'l Wildlife
Refuge - home of Heceta Sea Lion.

June 14, 1978

JR-14-78

2:15 P.M.

Siletz Bay (Head) just south
of Lincoln City, Oregon - rocky
promontory just south of River
entering at mouth of bay, lit. sand,
Sitkna & low salinity forms &
banded individ on & under rocks
on tidal flats. low tide was
about 1:00 P.M. Kodach frame 34, 35 (^{roll} 2)

June 15, 1978

JR-15-78

Sunset Bay State Park, Cape Arago,
just south of Charleston, Oregon 9:30 AM.
dropping tide. Littorina from rock
surfaces from mid tide line to
6-8 ft. above high tide line. larger
specimens on higher rocks; Fucus,
"ulva" present. A. sitchana & planaxis
Not seen. Tegula, "Murex" ^{em} An, Nes
crabs etc in pools. Salinity 25‰
Roll 2 # 36

37, 38 Shore Areas State Park
(shore → Botanical Garden)
ca 2 miles S of Sta JR-15-78

June 15, 1978

JR-16-78

11:30^{AM} - 12:15 PM

Cape Arago State Park - south
coast Littorina from rocks pools
at & above intertidal - low tide
ca. 12:30 PM. - abundant stranded
"By the Wind sailors" - Kodachrome #3
Frames 1-10 (11?)

June 15, 1978

JR-17-78

North Jetty, mouth of Coquille R,
Bandon, Oregon - *L. scutulata* +
Thais on rocks. 2:30 P.M.

June 15, 1978

JR-18-78

1-2^{mi} South of Port Orford Oregon - rocky
coast - *L. scutulata* ably -
on rocks - Salinity 33‰

Kodach 3 frame 12 Rogue River
Bridge, Gold Beach, Oregon.

Kodach 3 frame 13 -
below Cape Sebastian St Park
near Pistol River

↓ Frame 14, Crescent City, CA,
light house + 15

June 15, 1978

JR-19-78

Crescent City, CA near light house Pt.
Littorina scutulata from rocks
on rising tide also from farther
North on beach - Salinity 33‰

Kodachrome 16, 17, 18 - of sunset
over rocky peninsular islands

June 16, 1978

JR-20-78

9:15 AM

about 15 mi S of Crescent City CA
on US 101 - *Littorina scutulata* only
on rocks -

near Lagoon Creek

June 16, 1978

JR-21-78

10:30 AM

County Park, 1 mi SW of Orick on
route 101 - *L. scutulata* only
on large rocks at end of
beach (locality across from
Frederick Lagoon).

June 16, 1978

JR-22-78

11:45 AM

Ocean Beach Trinidad, State Park -
L. scutulata + from rocks & seaweed.

June 16, 1978

JR-23-78

12:15 PM

Trinidad, CA State Park - Bay
side of point *L. scutulata* only
from rocks?

June 16 1978

JR-24-78

245 - 415 pm

about 1 mi N. Santa, CA on West side
of Humboldt Bay, along marsh fringe
& mud interface - marsh grass hummocks
about 1-2' above mud at low tide.

L. newcombiana associated with
Atriplex & some *L. scutellata* at
base of *Salicornia* & under ferns
on damp mud. - Salinity 25‰

Kodachrome 3 from #23 of
beach, birds, pollution
24, 25 of sign & sandbar

June 17 1978 -

26 27 28 Kodachrome

Avenue of Giants sign

29-30-31

Mary & Redwoods

32 - Drive thru tree

33-34 Mendocino Valley County

dry grass & green trees & grove of
small trees?

June 17, 1978

JR-25-1978

ca 4+ North of Bodega Bay, CA.

SRA.1 *L. scutellata* only on rocks

June 17, 1978

JR-26-78

About 15 mi N of San Luis Obispo, CA.
on inlet along CA SR 1.
L. scutulata only on & under
small stones & cobbles.

South^{east} of Bolinas.

June 18, 1978

JR-27-78

San Francisco Bay about 1 mi
N of Oyster Point along side^{US} Rt 101
- 10:30 AM - ebbing tide - *L. scutulata*
on^{under} rocks along water line (looked
for *L. littorea* etc. to no avail)
Salinity 25 ‰ -

June 18, 1978

JR-28-78

Fort Point, San Francisco, CA, below
Golden Gate Bridge - *L. scutulata*
from rocks - sparse - high energy
beach Salinity 30 ‰ ca. 5:00 PM.
Kobach toll 4 1-4 of all site
& bridge.

June 19, 1978

JR-29-78

Naval Base on

Treasure Id, San Francisco Bay,
under Bay Bridge, West side

of Island - on algae covered

rocks, *H. scutellata* - Thais sp.

(high veg. cont) - on Naval Base

8:30 A.M. - mid tide

rising

June 19, 1978

JR-30-78

Naval Base on

~~East~~ Treasure Id, San Francisco
Bay, East side of Island on

Algae covered rocks (Fucus +)

under rocks - *scutellata* side

oblique 26° 00' 9:00 A.M. -

rising - mid tide - *Thais*

scutellata - at & just below

tide line & semi dry - usually

under rocks on Fucus.

June 19, 1978

JR-31-78

12:00 Noon

Moss Landing, CA. at entrance
to Harbor (S. side) on Rock Jetty.
both *A. scutellata* + *A. planaxis* (first
sighting) on damp sides of boulders
just at top of tide line (spray
zone) *A. planaxis* (almost) all were
apparently copulating (pairs or 1 lg.
+ 1 smaller individual) - note that
columnella of *A. planaxis* is a
delicate "salmon pink" color that
fades rapidly. Salinity 36.700!
Tide falling, low at about 2:30 PM.
Kodachrome Roll 4 - #5-12

June 19 1978

Kodachrome #4 - #13+14 - Moss
Landing Marine Lab + View of
Harbor (w) Power Plant

Kodachrome 4 - #15-16

Pt. Pinos ground squirrels +
rocky point, Pacific Grove
Cal.

#17 Golf Course + Lighthouse

#18 - Coast from same spot

road at Pt Pinos

P.G.

June 19, 1978

Kodachrome 4 - #19 - sign at St. Pierre,
Pacific Grove, Cal. Marine Refuge

MARINE SCIENCE CENTER

ON YAQUINA BAY



The Marine Science Center in Newport is the hub of Oregon State University's coastal research, teaching, and marine extension activities. It serves the general public and state and federal agencies, as well as the university. The Center was built in 1965 with the help of the Port of Newport, which provided the land, and the federal government, which granted initial construction funds.

PUBLIC MUSEUM-AQUARIUM

Museum panels and aquaria are windows to the ocean world for more than a quarter million visitors each year. Museum displays explain properties of the oceans, and aquaria exhibit specimens of Oregon's marine fishes and invertebrates. Special educational programs are offered to schools and other organized groups. The public area is open daily 10-4, and 10-6 during the summer.

OREGON STATE UNIVERSITY'S

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RESEARCH LABORATORIES

The Center's main building houses marine-related research projects of several university groups and of the U.S. Environmental Protection Agency. Some scientists study physical and biological phenomena of the Pacific Ocean and its estuaries, while others investigate pollution problems and how they affect marine life. Many of the staff work on methods to increase the wise use of our marine resources; they are studying fish and shellfish aquaculture, and developing improved fishing gear. Research programs are sponsored by federal, state and private agencies.

The Oregon Department of Fish and Wildlife has a separate building to the west of main building; research programs concern management of the state's marine fishery resources.

The Yaquina Head Station, about five miles north of Newport, is operated by the Center for special educational programs and research projects requiring a beach location.

RESEARCH VESSELS

Newport is the home port for the 180-foot WECOMA, 80-foot CAYUSE, and several smaller vessels of the School of Oceanography. Ship support facilities and the main dock are located at the northwest corner of the Center.

For additional information write:

OSU Marine Science Center
Marine Science Drive
Newport, Oregon 97365

The telephone number is (503) 867-3011.

June 19, 1978

Kodachrome 4 - #19 - seignat Pt Pinos
Pacific Grove, Cal. Marine Refuge

June 19, 1978

JR-32-78

Asilomar State Beach, west
of Pacific Grove, CA. Monterey
Peninsula. *L. scutellata* + *L.*
planaria on granitic (?) rocks
& boulders. Low tide. *L. scut*
from middle upper tide area
L. planaria in upper tide area
in spray zone above tide line.
Kodachrome taken to show
composition of rock surface (weathering
in planaria may be distinctive to
~~also~~ permit survival on multi-
colored rock. (?) S/m 4 #20-24

June 20, 1978

Kodach Roll 4 #26, 27, 28, 29
View of Salinas River Valley Fresno
County - (2 @ 60 2 @ 125)
near Chualar, Cal

Kodach. - 30, 31, 32 - Rest area
near Bradley & Camp Roberts
& hills around it.

June 20, 1978

Kodachrome #33, Mts. hills E. of
Morro Bay
#34 "mt of rock" at Morro Bay

June 20 1978 JR-33-78
1:00 P.M. ca low tide

Morro Bay, CA. - Rock Jetty S.
of Morro Rock *L. planaxis* &
L. scutellata from on + under
rocks,

JR-33-78-1 from beach
side of Jetty on mid + high
tidal levels

Not far down
inside beach
→ JR-33-78-2 from top +
outside of Jetty in ocean
spray zone. (spray heavy)

JR-33-78-3 from low tide
line on rocks, very young
- recently metamorphosed
specimens of both species

Noted large range of
sizes of *L. planaxis* egulating
film 4 - frames 36 - 38⁺ found
here at Morro Rock.

Pale #5 #1 "Big Sur" Coast N of Morro
Bay #2 Morro rock from town

#5
#13 Morro Rock from Park Museum →

June 20 -

Pismo Beach CA
6, 7 "Pismo Beach, Clam Cays"

June 20 JR-34-78
4:00 - 5:00 P.M.

Town of Shell Beach^{CA} (southern part of
Town) Public Beach with
steering down cliff face -
L. scutellata & *L. pleurostoma* on
rocks at low tide - many
(*L. pleurostoma* copulating.)
Kodachrome #5, exp 8 & 9 of
Shell Beach beach

June 21, 1978 JR-35-78
10:00 A.M.

El Capitan Beach State Park, about 15 mi NW ^{Santa} Barbara ^{Calif.}
on rocks in spray zone + upper
intertidal. Tide just below high
level. Salinity 31‰.

Kodachrome roll #5 exposure
10, 11, 12? - surfing beach

June 21, 1978

JR - 36-78

12:00 Noon -

Carpinteria, CA. State Beach -
Southern End of Beach - *L. planaxis*
+ *L. scutellata* from rocky outcrop,
falling tide.

Kodachrome Roll # 13, 14 taken
of many collections + of oil tar on
rocks with lens cap to
show size.

June 22, 1978

JR - 78

Negative Station (no collection)

No Littorina rocks

San Clemente State Park

Kodachrome #5 frame 15 - sign

+ 16 - "Hole in cliff", 10:30 am

June 22 1978

JR - 78

San Onofre State Park

Negative Station (no collection)

11:15 AM - no rocks

June 22, 1978

JR - 37-78

12:00 noon - abnormally high water

Carlsbad, Cal. *L. scutellata*

+ *L. planaxis* - S of State Beach
at Jetty at entrance to lagoon.

June 22, 1978

JR-38-78

2:30 PM

West (Ocean side) of Pt. Loma,
San Diego Co. (The pool
access area) on rocks above
sea h. ventral & planar - in
spray zone, some 2 planar ca 30'
above water on vertical cliff face
in spray zone & in pool like in
stone

Kodochrome R#5 frames 17, 18,
19, 20 of same area

June 23 at L.A. County Museum

June 24 L.A. to La Paz
Kodachrome # 21, 22, 23 views
of L.A. coast with rocks! in
shooting (+ 23 Polaroid Verdes)
+ 24, 25, 26, 28, 29, 30, 31, 32
33 looking

June 24, 1978

JR-39-78

about 4 miles north of La Paz
Mexico on Mex Rte 11 - Rocks just
above water along road. Verita
& h. penicillata. (about 7:00 PM)

June 25, 1978

JR - 78

Negative Station

in front of Hotel about 2 mi
N. of La Paz, B.C.S., Mexico. rock
jetty extending into La Paz Bay.
No Littorina seen.

Kodachrome Rolls - #35, 36 - Hotel in La Paz
jetty

June 25, 1978

JR - 4078

5:30 P.M.

El Centenario B.C.S., Mexico
just ^{west} of town on pebble
& sand conglomerate shore - low
tide. Red shells only seen - no
Littorina. (on ^{South} side La Paz
Bay)

June 25, 1978

JR - 78

Negative Station - 6:30 P.M.

About 1 mi N. of El Comitan,
B.C.S., Mexico - shoreline similar
to # JR-40-78 No Littorina.

+ Kodachrome #6 from 1-10 - La
Paz from El Centenario + El
Comitan + picture of sunset
from La Paz waterfront
checked rocks in downtown La Paz, Mex.

June 26, 1978

JR-41-78

12:00 Noon → 1:30 PM.

Punta Lobos Beach, about
4 Km S of. Todos Santos, BCS
Mexico. Littorina modesta (go)
pallida, pumellata, aspera,
in crevices of rocks above tide
line - Point at south end
of beach.

Kodachrome 6 frame 11-17⁺
of locality,

June 26, 1978

JR-42-78

San Pedrito, ca 7 Km. S of
Todos Santos, BCS Mexico

4 species littorines on shore
Cove with rocky headland at
S end. Littorines actively crawling
in surf on wet rocks - nearly
high tide - 2500 in
open surf - 1200 in hypoxanthine
lagoon behind beach.

Kodachrome 6 - frames 18-21⁺

22 - Palm grove + road
23 - Ranch House

Kodochrome 24

Puerto Lobos from Highway

25 Todos Santos
from South on Highway

26 - Sign to Boohay

27-30 along road to
La Paz from
Todos Santos
Cactus + Mt. S.

Kodachrome 31 - 28 km out of
La Paz - Rd from SW.
Mex. Hwy. #1

at San Pedro

Met a fishery man who said they
were going to turn the quiet cove
into a yacht basin to encourage
tourists -

Palm grove + lagoon on edge
of beach - ranch also -

June 27, 1978

Kodachrome 32-33

- on road to Cabo San Lucas

#34 - El Triunfo from
hill just before reaching
town

#35 mountain from Rd. between
San Antonio + San Bartolo

#36 } mountain + canyon before
#37 } San Bartolo
#38 }
#39 }

to END OF FILM -

Film #7 Kodachrome #1

view up canyon where
highway crosses arroyo
just before road reaches La
Barrile

June 27, 1978

JR-43-78

Los Barriles - Rocks on
Sandy Beach - *L. pinnulata* on
sunny side of rocks (some) + *Sipbura*
+ spiral egg masses on wave
pitted rocks. about 1" across

Kodachrome #7 - to #8

#7 #8 -

view of mts to right of highway
of mts with clouds on top
(to left was bay) just out of
Los Barriles toward San Jose del Cabo

Kodachrome #10 -

Mt Range west of highway
near Las Cuevas.

Kodachrome #11 + 12

TROPIC OF CANCER LINE

13 + 14

beach + punta palmilla
near San Jose del Cabo

#15 View of Lands End, Cabo

#16 view other way

San Lucas

June 27, 1978

JR-44-78

11:45 AM

Cabo San Lucas, BCS, Mexico
on jetty next to cannery factory
L. pullata, penicillata, aspera
modesta on rocks & in cracks
L. pullata seems to prefer
wet rocks, near ferry dock

Kodak roll 7⁵ 17-21
of factory rocks etc.

#22 Hotel @ Horse

#23 House @ tank on
roof

X! Soaked in Penny's men's Room

June 27, 1978

JR-45-78

Between Cabo San Lucas & San Jose
Del Cabo - Public Beach with
rocks (4?) species on rocks
young penicillata lives highest,
Next Modesta, then pullata

Kodak 7 # 24-32 ↑

June 27, 1978

Kodachrome 33 - toward San
Jose del Cabo from
hiway near Cabo San
Lucas HOTEL (9 mi e. C.S.L.)

Kodich. #34 view toward
San Jose del Cabo
from hiway approaching
from Cabo San Lucas

June 29, 1978

JR-46-78

Public Beach above Pichilingue
Ferry Dock, ca 11 miles (17 km)
North of La Paz, B.C.S., Mexico.

Littorina penicillata, L. ? + various
other mollusks from rocks (on +
under + in cracks along rocky
headland north of beach - many
nerita eggs in pools. Few mangroves
with few *L. penicillata* on lower trunks

Salinity 32-33 ‰

8:30 am

lowish tide

Kodachrome Roll 7 to end

"

" 8 #1-4

June 29, 1978

JR-47-78

Sheltered bay with mangrove fringe
about 2 miles south of Pichilingue
Ferry dock. L. jewillata rare
on rocks - mangrove searched
to no avail.

Salinity 35‰

Kodachrome 8 # 5

June 29, 1978

JR. 48-78

Same as JR-39-78 12 NOON

Kodachrome 8 # 6-8

Salinity 36‰

June 29, 1978

JR-49-78

Beach next to

Ferry Dock, La Paz, at end
of Sinaloa St. Pecten shells
(dead) from fishing boats. No
Littorina seen although there is a
sea wall well inside bay & harbor.

Salinity 33‰

Kodachrome 8 # 9 view of La Paz

from west of town - our motel in trees just
100-200 yards boat mast.

June 29, 1978

JR 50 78

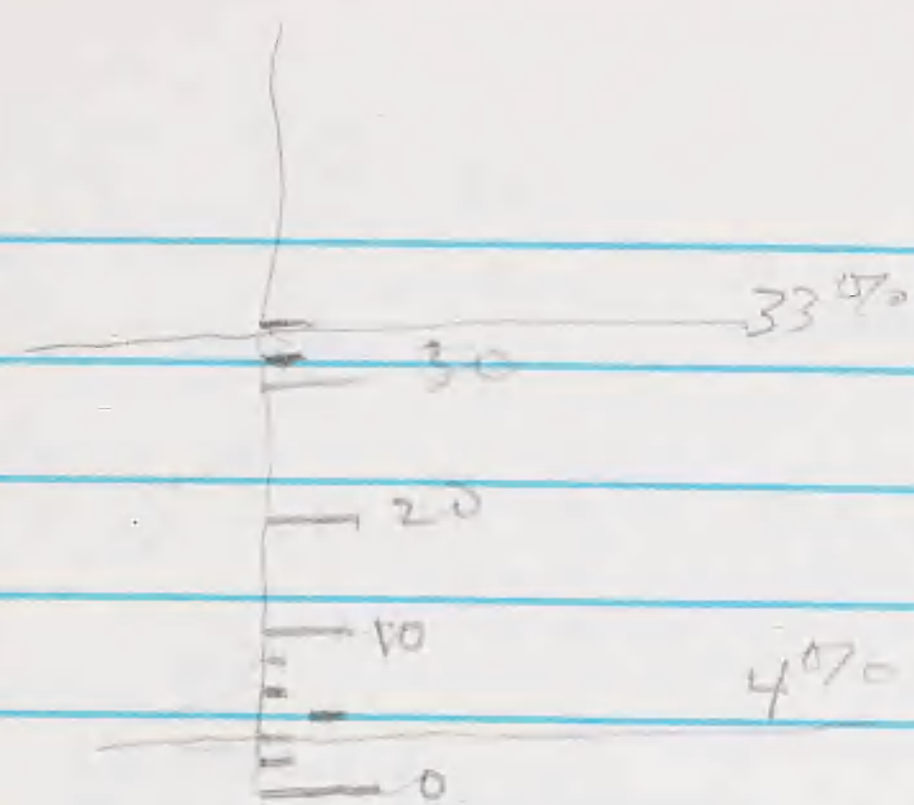
Negative Aberr - 7:30 AM

Checked gully North of Hotel
about 2 miles North of La
Paz, BCS, Mexico. No life
on rocks - apparently recently
dumped in place.

June 30, 1978

Kodachrome Roll 8 # 10-12¹ E. coast
of Baja California Sur north of
La Paz to show sandy shore
+ relief of mountains.

Finish



Adak, Aleutian Ids. see typed station list ↓

Sta JR-1-79 - June 4, 1979 - 7:40 pm

Temp 10°C Salinity 4‰

Traffic Circle Pond - at end of Sweeper Creek

Littorina (sitchuan?) - large number collected from pond polluted w/ oil + gas run off. Sample placed in 5% formalin.

JR-2-79

June 4, 1979 8:30 pm

Temp 7°C Salinity 28‰

Sweeper Cove - NW side 100 yds E of

Traffic Circle Pond. Littorina, Mytilus + Acmaea from rocks - preserved in 5% formalin.

Note: Many smooth forms at #1 above at low salinity; at #2 most litt. were more uniformly spirally furrowed. (? Salinity effect?)

Adak

JR-3-79

June 5, 1979

Temp 7°C

Salinity 29‰ 8-10 AM

Along seawall - just outside of
Sweeper Cove - Littorina, Isopoda,
Murella, worm, limpets, chiton from
rocks and algae.

JR-4-79

June 5, 1979

Temp 10°C

Salinity 0‰ 1:30-4 PM

North shore, S.W. corner of Jager Bay,
rocks, seaweed, gravel. Littorina, Isopoda
(mudflat var) limpets, Mya shell seen
(from clambake?)

Note communal spawning in Littorina
altima - or many or two dozen
females (?) producing massive
spawn several inches across. Fertilizer
very variable - white, dark, smooth,
sculptured, etc. etc. Specimens &
photographs taken.

JR-5-79

Temp 5°C

June 6, 1979

Salinity 28‰

8-10:30 AM

sandy beach (strand) and rocky coast
to north of Naval Facility Bldg. - west
shore of Kulu Bay.

Littorina alutica from barode + algae
covered rocks, ~~*Agardhiella*~~ (?) from
base of shore rocks

JR-6-79

Temp. 8°C

June 7, 1979

Salinity 3‰ 8:25 AM

S.W. End Suez Cove at point of
entry of freshwater stream. Fine
covered rocks, pebbly sand,
cobble + pebbles

GR-7-79

June 7, 1979
9-10:30 AM

Freshwater stream flowing into
foot of Finger Bay, Adak, following
stream by toward waterfall
along road. Small planorbis on
stones in backwater areas. Caddis
fly larvae in same situation.

JR-8-79
8°CJune 7, 1979
23‰ Salinity - 10:45-12N

S.E. side of Finger Bay, Adak.
Littorina (Thais) Lingula from
algae and stones. L. littorina
noted to be copulating and
laying eggs (both in) on algae

(mass spawning)
in common large egg mass under
rocks

JR-9-79

10°C

June 8, 1979

- 0‰ Salinity 9:30-10 AM

SW side Lake Andrew at dump
+ foundation site (Hudson body
seen) - Lymnaea from
temporary pools in foundation
and near shore

JR-10-79
8°C

June 8, 1979

28‰ Salinity 10:30-12

South side Clam Lagoon -
inside
much on sand flat - rocks
+ weed

JR-11-79

June 8, 1979

Same as JR-5-79 - Jellyfish
+ Clenophora stranded on beach.
Accumulation from tide pool
under rocks.

JR-12-79

June 9, 1979

11^{AM} - 1:00 PM

East side of clam hagon on
sand flats - clams (Mya, Tresus?, Siligua,
Trachycardium, etc) dug from sand.
+ Turf starfish.

JR-13-79

June 10, 1979

5°C

29‰ salinity

North end Adak - near Joran
station - Bay just N of boat
ramp area.

J. dentata on dark brown short algae (sample
for HARRIS?) + little red bivalve
on same algae - none in view. *

highly reproductive - no eggs seen
in others - out on rocks in pool.

well - ecological displacement due to
lack of competition?

Bivalve in all areas, several species of
bivalves - many larger - Myosotis.

JR-14-79

June 10, 1979

Hot spring area at N end of
Andrew (Shagok) Bay - Insects
from flat rocks in warm water
(70°F) - B.R. Overhill!

JR-15-79

11 June 1979

9-11 AM

Base of mt. Moffett, w. base
of Adak Naval base, from
pool of mountain stream, slugs
crawling on tundra vegetation.

JR-16-79

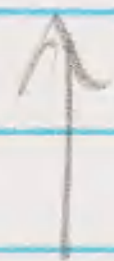
14°C

13 June 1979

16% salinity

ca 3-4 PM.

Stika alaka - from rocks at
either end of suspension bridge
(connecting Japowski and Paganini
Islands). Tide rising - Littorina
situated plentiful above water
level; h. minutula at and below
water level. No Lützowia, Lützowia
leak, Lützowia, & several others
on rocks.



see typed field station list

Odiorne Point State Park
Rockingham Co., Rye N.H.

JR-17-79

28 June 1979

15°C 28% salinity

7:30-9:00 AM

Odiorne State Park, US Rt. 1-A -
just south of Portsmouth, N.H.

Littorina (3 species) Nucella

acmaea

Lo

1

2

3

4

5

6

6a

JR-1

Salinity

"

July 1979

30-12:00 N

St. George

bridge

mainland

next

(49)

glacial

by -

1

2

3

4

5

6

6a

Varshall

John

ollette

Jardner

Wilson

~~West~~

JR-15-79

11 June 1979

9-11 AM

Base of mt. Moffett, W. side
of Adak Naval base. From
pool of mountain stream, slug
crawling on tundra vegetation.

JR-16-79

14°C

13 June 1979

16‰ salinity

ca 3-4 PM.

Suba alaka - from rocks at
either end of suspension bridge
connecting Gupowski and Paganini
Islands. Tide rising - Littorina
patches planted above water
level; h. mussels at and below
water level. No large living
leaves of vegetation & several others
on rocks.



see typed field station list

Odiorne Point State Park
Rockingham Co., Rye N.H.
JR-17-79

28 June 1979

15°C 28‰ salinity

7:30-9:00 AM

Odiorne State Park, US Rt. 1-A -
just south of Portsmouth, N.H.

Littorina (3 species) Nucella
acmacea, etc from rocks at
low tide. (Littorina for isoenzyme
study)

JR-18-79

Papua New Guinea

8 July 1979

Salinity - 6‰ air temp

11:30-12:00 N

" 14‰ water

Northwest end of St. George
Island just across bridge
from Pines Point, Manus Island.
On much grass next
to road (rd Route 249)
St. Marys Co. Maryland
Littorina murex
for isoenzyme study -

Nov. 14-20 Bermuda
(14th Travel 20th Travel)

JR-19-79

15 Nov 1979

Tobacco Bay, Northeast end
St. Georges Island, Bermuda

10:30 - 12:30 Chitons, Mytilids, misc
mollusks from rocks at and
below low tide line.

JR-20-79

15 Nov, 1979

Ferry Reach, South side St. Georges Id.,
Bermuda, 8:00 - 8:30 P.M. sweep net in algae
& sand - 2-3' - at Bermuda Biological Station.

JR-21-79

16 Nov 1979

Hungry Bay, south side
Bermuda Island, Bermuda

10:30 - 2:00 P.M. Chitons,
Mytilids, Littorinids, etc. from intertidal
rocks and mangroves.

(JR-21a-79, chitons collected outside
of Bay on open coast - for
@ Hendricks)

Brachidontes domingensis Lam, 1819
Chiton tuberculatus Linne', 1758.

JK-22-79

16 Nov 1979

Gravelley Bay, south side Bermuda
Island, Bermuda 11-1 P.M.
Littorinids + Neritids from
intertidal rocks. D. Pawson!

JK-23-79

16 Nov. 1979

Grounds of Bermuda Biological
Station, southwest shore of St.
George Island, Bermuda. Land
snails from leaf litter (also
valves of *Macroschista*) 9:00 P.M.
+ miscellaneous sawbugs, spiders, earthworms

JK-24-79

17 Nov, 1979

Coney Island, northeast tip
Bermuda Island, Bermuda (small
bay at N. end of island) 11:00 - 1:00 A.M.
Miscellaneous mollusks from intertidal rocks.
(note association of erycinid and *Brachidontes*)

JR-25-79

18 Nov 1979

Flatts Inlet, Harrington Sound,
North side Bermuda Island,
Bermuda. from intertidal rocks
just inside causeway at entrance to
sound. 12-2:00 P.M.

JR-26-79

18 Nov. 1979

Bermuda Biological Station Ferry Reach,
south shore of St. George's Id, Bermuda
- formation wash of algae - some
minute mollusks present.

+ additional mollusks to come from
dredging made 19 Nov 1979 with
M.L. Jones
↓

JR-1-80

12 May 1980

Ferry Point - South Side

Inlet across from Whalebone
Bay, St. George's, Bermuda
2:00 P.M. grass flat, mangrove
Bittium Littorina, etc.

JR-2-80

12 May 1980

Ferry Point - tip of Point +
inside under rocks + on rocks
Chiton, Columbella etc.

JR-3-80

13 May 1980

Natural Arch, Tankers Town,
10:00 AM Bermuda - Ocean side
Littorina Tectarius + Nodilittorina
on rocks

JR-4-80

13 May 1980

1:00 PM Hungry Bay, Bermuda
Littorina + Chiton for metal
study

JR-5-80

14 May 1980

Tobago Bay, Bermuda -
9-30 - 11:30 A.M. → for tests
Falling tide, Anthurium + thair +
chitons.

JR-6-80

14 May 1980

1:00 P.M. - 4:00 P.M.

Coney Id. Bay, Bermuda
low tide, sand, weed, rocks

JR-6a-80

margin of Coney Id. Bay.
land snail on vegetation (Cordia
allena).

JR-7-80

10 Sept 1980

11:00 - 12:00 AM

Mouth of Roosevelt Inlet on rocks
at fishing beach, Breakwater Harbor,
Lewes, Delaware; falling tide—
Littorina littorea and L. saxatilis
on rocks near breakwater barrier
among barnacles (Salinity 32-33
ppt).

JR-8-80

10 Sept. 1980

1:30 - 3:30 PM

North shore Indian River Inlet,
about 7.3 miles south of Rehoboth
Beach, Delaware; on rocks flanking
outside of inlet promontory;
Littorina littorea and L. saxatilis
in upper barnacle zone the former
rather rare and small, the latter
common, nestled among barnacles
(very variable coloring).

Station 1-8
all

#1

0830

Luis LOBAINA, J.F. Milera, Renzo Rodriguez
+ J. Rosewater

13 Nov 1980

Peña El Fraile, Fraile, Santa Cruz de Norte

Succinea, Protidella, Brachybaena, Ocenebra
On way in to rect. Rocks with
Littorina, Tectarius, Purpura, + Cerion
on vegetation back of rect.
(Ziczac and L. mespillum very common

#2

Matanzas

10:20 Punta De Maya, Delante Del
Faro (Lighthouse) Diēte De Perro
Shore (very low points) Planaxis nucleus,
Littorina angustior, L. lineolata, L. ziczac,
Melampus, Pedipes.

#3 Observation along road of Cerion
maintenencia on tanks of De Cocotero
palm

12:00 Lunch

#4 Observation of Littorina nebulosa at
Vista Alegre since previous sunset. etc -
no collection.

#5 Playa Laaga - Bahia Cardenas

Littorina nebulosa plentiful, but with
oil pollution. - no collection

#6 Playa Mujeres - Bahia Cardenas
on cut off trunk of mangrove
L. nebulosa

#7 East of Bahia de Cardenas -
in Rice Paddy - *Brongniartella*
havensis & *Physa* abundant
- water only a few inches deep.

#8. Playa La Sierra - Cardenas
shells in drift (Toxela division?)
+ collected all along once through
mangrove coat - now silted in.
Littorina angulifera used to be there
- but only 6 specimens found. +
L. nebulosa abundant.

#9 +

14 Nov. 1980

Acerca de Varadero

Zona de Chapelin. Many lit. angulifera
on cement wall of canal de Chapelin.
More than 50 yr sea copulating. Also
L. nebulosa, less abundant. Collected
eggs of *Streblospio* to observe development

#10. Punta Molas, en el Farallon
(lime cliff near #9) collected *Chamaeleon*,
Coris, etc.

#11 Playita de Los Molas, Arroyo
Fangosa (muddy) many dead brachiopods
& *Physa*, *Streblospio*, *Streblospio* + dead
Littorina fossils.

#12 Finca Frances (a beach + mangrove
grounds) *L. megillum* (larger than
before) *L. angulifera*, *L. zeyheri*, *L. lineata*
N. tuberculata + *C. nebulosa* + +

#13 Farallon De Las Americas, Cienfuegos,
Tentacles, *L. angulifera* on cliff; *L.*
lineata is below on reef (cliff de perro)
Variation in color of Tentacles

Cont'd

14 Nov 1980

Sta #14 - 1500 hrs. La Conchita.

T. muricata benthic, grande y abundante,
C. nodulosa, *Nodilith* *angustior*, 1 only
L. lineolata, *N. peltata*, *serice*, *Planor*
+ *Ceiza*. Evidence of Hurricane Hugo &
high tide

Sta #15. Playa Pinar de Camacho -

Much drift material. *Troch* *cochlear*
Olivella *Oliva*, *Cypraea*, *Fossuella*,
Hemion, *Troch*, *Pagurus*, *Planor*,
Nodilith, *Troch*, *Trachia* - *area*
modesta, *luchitosa*, *Coma* *Cypraea*,
5 y 15 - left for Havana or
Motel picked us out at 4:00 PM.

#16

largest city

South Coast of Cuba

Nov 15, 1980

to Playa Ciego, Güira del Melón.
crossed canal in plastic boat and
worked west of canal, *L. nebulosa*
abundant and large size - in mangrove
+ *truncatella* + *polygyra*. Took boat out
to end of pier (4 m long):
many, many *L. nebulosa*. + in

drift line east of canal + S of city
~~see many *luchitosa* etc.~~

Playa Ciego near Güira del Melón

maina cono #16 pero Nov 15

Sta #17 East of Canal and S of City

Quantities of drift incl. *Ludina*
gemma, *luchitosa* predominating (yellow,
white etc, *Foss*, *Troch*, *Bell*,
+ *L. nebulosa*

Nov 15

Sta. 18 Batabanó 12:00 W. - Rain
+ high winds limited our
collecting. Collected only a few young
L. nebulosa in vicinity of Muelle
de Fomento

→ San Francisco de Paula (Havana)
16 Nov 1981
Start 19 on grounds of house & museum
of Ernest Hemingway - collected
a few land snails; *Chondropoma*,
Congerostoma, *Oleptoma* & *Caracolas*
shagreen. Bish (of Oriente Prov.
brought to Havana by Arango 120
years ago.

(Terreiros) frequented
& visited Cojimar & restaurant where Hemingway
Start 20 Cojimar (little fishing
port which inspired Hemingway -
"Old Man & the Sea" - collected *T. murina*,
N. tuberculata, *C. nok*, *L. zygae*,
L. mesaspis, argus on sea wall.
Then on rocks, in sand. Failed
colony of *L. mesaspis* on a
rock near the very low tide line
Also a few *L. mesaspis*.

SAUNDERS & WEHMAN 1977

SAUNDERS & WEHMAN 1977

Logy Bay
N. of St. John's,
Nfld.

21 July 79

Site of Marine
Service Dispatch
Lab. MUM.

CFER

rec'd 8/1/79
into ²⁴120 @
10:00 AM

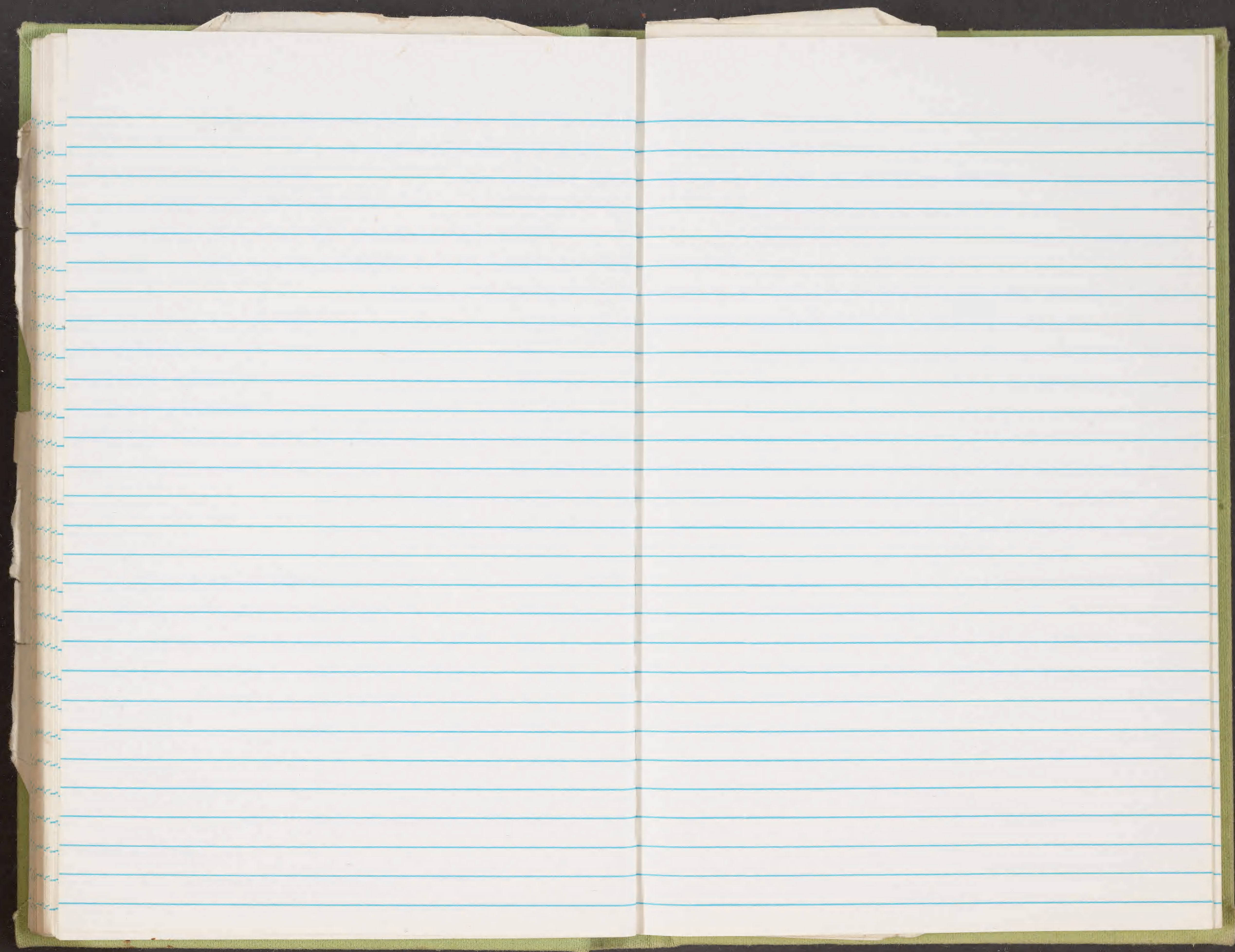
100 into Tris
+ Balance frozen 2 Aug
179

→ San Francisco de Paula, (Havana)
16 Nov 1981

Stat # 19 on grounds of house + museum
of Ernest Hemingway - collected
a few land snails: *Chondropoma*,
Gongylodonta, *Aligona* + *Caracolas*,
sahemou. Bich (de Oriente Prov.
brought to Havana by Arango 120
years ago.

+ visited Cajimar + restaurant where Hemingway
stayed. (Terzo) requested

Stat # 20 Cajimar (little fishing
port which inspired Hemingway -
"Old Man + the Sea" - collected *T. murina*,
N. tuberculata, *C. rot.*, *L. gigas*,
L. lineolata, *argentea* on sea wall.
Then on rocks, in sand. Found
colony of *L. meleagris* on a
rock near the very low tide line
Also a few *L. mespilum*.



Isoenzyme - Adak
into buffer/June 6, 1979

Littorina atkana⁺ Station JE-1-79

- 1-1 dark gray, smooth
1-2 * light, gray, fine brown stripe, smooth *
1-3 medium gray, closely brown wide stripe, smooth
1-4 medium brown, weak sculpture / ^{lt br.} stripes on scult
1-5 dark brown, moderate sculpture
1-6 dark brown, weak sculpture, hint brown stripe
1-7 yellowish gray, smooth - veiled ^{thick} gray stripes
1-8 brown, moderate sculpture
1-9 brown, hint of sculpture
1-10 thick dark grey + lt. gray stripe, smooth
1-11 * light yellowish gray, fine br. stripe, smooth *
1-12 greenish brown, dk br stripe, sculptured
1-13 reddish brown, sculptured
1-14 dark brown, weak sculpture
1-15 dk greenish brown, strong sculpture
1-16 dk greenish br, weak sculpture
1-17 medium brown, moderate "
1-18 dk br gr, smooth "
1-19 red br., smooth "
1-20 br, grayish, green, weak "
1-21 wide dk grey + lt. grey stripes, weak sculpture
1-22 br green, moderate sculpture
1-23 dk green, " "
1-24 " " " "
1-25 red br, smooth "
1-26 dk grey " "
1-27 Gray Green, moderate "

1-28 Green grey - weak sculpture
 1-29 " " - moderate "
 1-30 dk " - very weak "
 1-31 grey-white, blotchy - weak "
 1-32 dk grey - " "
 1-33 " " moderate sculpture
 1-34 " " weak to moderate "
 1-35 " " " - sculpture
 1-36 red-br str., weak "
 1-37 dk green, smooth
 1-38 * dk grey yellow, fine br stripe - smooth *
 1-39 dk green, weak sculpture
 1-40 dk grey, brown stripe (masked), mod. sculpture
 1-41 dk br, mod. sculpture
 1-42 dk yell. green, weak sculpt.
 1-43 br. green, mod. sculpture
 1-44 dk, br, violet stripes, practically smooth
 1-45 dk, green br. " " " "
 1-46 " " " " " "
 1-47 " " " " " "
 1-48 dk grey, violet stripe " "
 1-49 * yellow grey, fine br str, — " *
 1-50 dk grey practically " "
 1-51 dk brown-black - smooth
 1-52 dk gr. br - weak sculpture
 1-53 dk green br - smooth
 1-54 " " " violet stripe, w. to m. sculpt.
 1-55 " " " " " " "

1-56 *yel-grey - fine br str., smooth *
 1-57 *yel " - no stripes - " *
 1-58 dk br., violet str - very weak sculpt
 1-59 yel, green " " " "
 1-60 dk greying br, mod. sculpt.
 1-61 red-brown, high sp. smooth
 1-62 brown, violet str., nearly smooth
 1-63 greenish br. violet " , weakly sculpture
 1-64 dk gr, nearly smooth
 1-65 " " " "
 1-66 " " " "
 1-67 " " " "
 1-68 yell br, violet str. " "
 1-69 brown weak sculpture
 1-70 dk grey " "
 1-71 " " - nearly smooth
 1-72 brown weak sculpture
 1-73 dk. brown nearly smooth
 1-74 dk, greenish brown - weak sculpture
 1-75 brown, violet stripes, " "
 1-76 " " " smooth
 1-77 dk, greenish brown nearly smooth
 1-78 " " " " "
 1-79 " " " mod. sculpture
 1-80 " " " weak sculpture
 1-81 " " " " "
 1-82 " " " " "
 1-83 " " " smooth

1-84	dk greenish brown	moderate sculpture
1-85	" " "	weak "
1-86	" grey	smooth "
1-87	brownish green	mod "
1-88	dk brown	weak sculpture
1-89	* grey with cloudy ^{fine} streaks	smooth
1-90	dk, br violat stripes	"
1-91	" " " "	"
1-92	" " " "	"
1-93	dk grey	"
1-94	" br grey " "	weak sculpture
1-95	green brown " "	smooth
1-96	dk brown	"
1-97	" " " "	weak sculpture
1-98	dk green	smooth
1-99	brown	"
1-100	dk green	nearly smooth

X

[idea that these forms are result of disruptive selection - that the various forms are interfertile, interbreed and maintain + increase the variability]

Isoenzyme - Adak

into Butter June 7, 1979

Lithornia atkanat

Station JR-4-79

4-1	med grey, vield stipe, nearly smooth
4-2	yellow grey, broad dk stipe, mod sculpture
4-3	yellow grey, moderate stipe, weak sculpture
4-4	dark br grey, white stipe, smooth
4-5	greenish grey, vield stipe, nearly smooth
4-6	yellow grey, moderate sculpture
4-7	dark grey, vield stipe, weak sculpture
4-8	yellow green, vield stipe, moderate sculpture
4-9	broad dk brown + white stipe, smooth (Thyridal stipe)
4-10	brown, vield stipe, moderate sculpture
4-11	Grey, weak to moderate sculpture
4-12	broad dk greenish brown, pale yellow + white stipe, mod sculpt
4-13	mottled, brown, grey, molybdenum, white, mod sculpt
4-14	med grey, green - smooth
4-15	mottled grey white - moderate sculpt.
4-16	green-grey, fine stipe (vield), weak sculpt
4-17	" " " " " "
4-18	" " " " " "
4-19	broad dark brown, narrow white stipe, mod sculpture
4-20	" " " " " "
4-21	lt grey, dark grey & br, weak sculpture
4-22	med grey, smooth
4-23	" " , vield stipe, brown splashes, smooth
4-24	" " " " " " weak sculpture
4-25	med. brown, brown stipe on spiral sculpture, strong sculpt.
4-26	mottled green, grey, mod. sculpture
4-27	dk grey green, vield stipe, mod. sculpture

- 4-28 lt grey, faintly violet tinge on sulpt / ^{mod} sulpt
- 4-29 ~~Σ~~ yellow brown, orange lip, strong sulpt.
- 4-30 # brick red, - smooth
- 4-31 * yellow - smooth
- 4-32 green-brown, weak sulpture
- 4-33 " " smooth
- 4-34 med yellow, violet stripe, mod sulpt
- 4-35 med grey, " " " "
- 4-36 grey-green, " " " "
- 4-37 brownish green, ^{br} stripe on sulpt, heavy sulpt.
- 4-38 grey-green, violet stripe, weak sulpture
- 4-39 " " whitestripe at shoulder & base, ^{mod} sulpt.
- 4-40 grey yellow, weak sulpture.
- 4-41 mottled lt grey - brown, weak sulpt
- 4-42 dk brownish green, violet stripe, weak sulpt.
- 4-43 ⊗ dk br. green, heavy sulpture
- 4-44 * orange-yellow - smooth
- 4-45 x dark orange brown - fine stripe - smooth
- 4-46 dark brown - heavy sulpture
- 4-47 yellow grey, violet stripe - smooth
- 4-48 smooth Narella
- 4-49 blotchy brown - smooth
- 4-50 blotchy brown - smooth
- 4-51 greyish yellow & grey stripe - smooth
- 4-52 Smooth Narella
- 4-53 blotchy brown + grey - weak sulpture
- 4-54 dk brown/grey - moderate sulpture
- 4-55 reddish grey - moderate - strong sulpture

- 4-56 orange-grey - mod sulpt
- 4-57 whitish grey - mod sulpt
- 4-58 yel-green - " "
- 4-59 dk grey - weak sulpt
- 4-60 " greenish grey - weak sulpt
- 4-61 " " " mod "
- 4-62 yel grey & fine brown on sulpt. - mod sulpt
- 4-63 dk blotch br - weak sulpt.
- 4-64 dk green - violet stripe - smooth
- 4-65 dk grey - mod sulpt.
- 4-66 mottled lt. grey - weak sulpt.
- 4-67 dk brown - violet stripe - weak sulpt.
- 4-68 mottled dk grey - weak sulpt.
- 4-69 grey/reddish yellow - mod sulpt.
- 4-70 mottled lt/dk grey - weak sulpt.
- 4-71 (reticulate slightly) brownish/yel green - smooth
- 4-72 dk green & lighter stripe at shoulder & jingly ^{mod} sulpt
- 4-73 dk brown - mod sulpture
- 4-74 mottled lt grey - weak sulpture
- 4-75 dk red/brown - heavy sulpture
- 4-76 dk green - mod sulpture
- 4-77 " " weak "
- 4-78 brown - mod "
- 4-79 dk grey & violet stripe - smooth
- 4-80 1/2 brown & grey ^{br} " mod sulpt
- 4-81 dark brown/white dark stripe - smooth
- 4-82 dk yellow grey - weak sulpture
- 4-83 dk green - weak sulpture

4-84 grey/white (dk spine) weak sculpture
 4-85 red/grey / milled stripes - " "
 4-86 dk brown - mod sculpture
 4-87 dk greenish brown - heavy sculpture
 4-88 red/brown - mod " "
 4-89 grey/green - milled stripes / mod sculpture
 4-90 dk " - " " weak "
 4-91 blotchy brown/grey mod sculpture
 4-92 dk green/brown - " "
 4-93 " & grey weak "
 4-94 whitish grey " "
 4-95 blotchy brown " "
 4-96 dk green / milled stripes " "
 4-97 grey & dk stripes below pishy / strong sculp
 4-98 " " " " " " "
 4-99 " - mod. sculpt.
 4-100 dk brown - smooth -

h. alutaca

JR-5-79

8 June 79

5-1 Dark Brown
 5-2 " "
 5-3 " "
 5-4 " "
 5-5 " "
 5-6 " "
 5-7 " "
 5-8 " "
 5-9 " "
 5-10 " "
 5-11 " "
 5-12 " "
 5-13 " "
 5-14 " "
 5-15 " "
 5-16 mottled red, grey, brown - blotchy
 5-17 " " " "
 5-18 " " " "
 5-19 " " " "
 5-20 " " " "
 5-21 " " " "
 5-22 " " " "
 5-23 " " " "
 5-24 " " " "
 5-25 mottled grey / brown
 5-26 " " " "
 5-27 " " " "

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Grey with brown stripe (fine)

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5-86

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5-91

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5-96

5-97

5-98

5-99

5-100

sitchana

dark, heavily
mottled

12/14 @
with ice -

Date

Sta No

Time

Locality

Ecology

Bottom

Temp above

Water Temp

Salinity

Tide

Depth

Photograph

General Comments

- South Cove, Cape Arago, nr Charleston
- Cape Arago lighthouse, nr Cook Bay
- South Slough near Charleston (inside)

5-85

5-86

5-87

5-88

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5-90

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5-98

5-99

5-100

SR-16-79 L. sitchana

in Tris

16-1-100 - dark, heavily
sculptured phenotype

put in containers 12/14 @

9-10 AM with ice -

JR-17-79 L. littorea

17-1-50-L (into Tris +
frozen 7/2/79)

JR-17-79 L. obtusata

17-1-50-0 (into Tris +

1. striped - "like littorea" frozen 7/2/79)

2 "

3 "

4 yellowish green

5 " "

6 " "

7 " "

8 " "

9 " "

10 " "

11-25 - dark brown, very low spire

26-50 Olive green - "typical"
(#44 was dark more like 11-25)

JR-17-79 L. saxatilis

17-1-100-S into Tris +
frozen 7/3/79

1-25 Grey-white typical saxatilis

26-34 Grey-brown, smaller, heavy sculpture
- white band into aperture, purple spot
on columella

35-51 dark brown, turbinate, sculptured, dark aperture

52-59 Orange color - moderately sculptured

60-66 banded

67-100 Olive brown (dull) larger, sculpture
smoothish to heavily sculptured
("saxatilis?")

JR-18-79 - L. irritans

18-1-59-i into Tris +
frozen 7/9/79

(C.R.)-19-79

Logg Bay, North of St. John

Nfld 21 July 1979

L. sapidula

19-1-17 Brnch red, fine sculpture

19-18-47 - Grey ^{fine} mottled body + coarser on

19-48-65 *P. eulrosa* - dashed bands
with white flecks = young? 17-48²

19-66-91 - Brown with modest sculpture
+ purple gutters

19-92/ wide dark + light banded

19-93-100 Misc

(note shells all very thin)

JR-1-81

May 15, 1981

4:00 - 5:00 PM

Northeastern University Marine
Laboratory, Nahant, Massachusetts -
from large granitic boulders at low
tide - in crevices and associated with
barnacles. Littorina saxatilis +
collectors: Linda Haas, Ruth Turner,
J. Rosewater!

* was given 2 other lots by
M.P. Morse collected at Eastport, Maine
in May 1981

one from Dog Island + another from
Crows Neck

JR-2-81 August 21, 1981

3:00-3:30 P.M.

Beal Island, off Jonesport,
Maine - rocks on shore. High tide.
No mollusks found, negative station

JR-3-81 August 21, 1981

6:00-6:30 P.M.

west shore of Passamaquoddy Bay.

Redcliff Motel, about 12 miles south
of Calais, Maine - rocks along
base of cliff, seaweed Littorina
saxatilis higher + L. littorea on
wet rocks uncovered by falling tide

Salinity

Temperature

Note: L. saxatilis not on high shore
rocks here but lower on wet rocks
being uncovered as tide drops. Is
this because of greater tidal range
here?

Photos taken #1 - thru #6⁺(4)

JR-4-81 Aug. 22, 1981 7:30-8 AM

Same as JR-3-81 $\frac{8}{10}$ low tide
W temp 58°F , Salinity 26‰

JR-5-81 Aug 22, 1981 9:30-10 AM

Pocologan, just E of
low tide - gradual sloping
shore, rocks, weed - L. littorea,
sapids, mytilus, Thais (dead)
Salinity 14‰ freshwater run off
+ fish water.

Pictures taken $\pm 7, 8$

JR-6-81 Aug 22, 1981 5:00-5:30 PM

Tidal Bore, Truro, Nova Scotia
negative station - no
mollusks found. This locality
at mouth of Bay of Fundy

JR-7-81 Aug 23, 1981 9:30-1:30 PM

Salinity 31 ‰ Temp 65°F
5 Islands Provincial Park, ~~east~~
5 Islands, N.S.
low tide uncovered areas of
sand mud flat, - found Littorina
3 sp + Thais + Polinices, Petricola
Gastropoda etc. - very good locality.

JR-8-81 Aug 24, 1981 9:00-9:30 AM

St. Margarets Cove, Glenora, N.S.
SW. of Halifax - medium low
tide - lowered salinity, low
rocks - L. littorea, moderate only
- scanty sea weed - sal 26 ‰

JR-9-81 Aug 24, 1981 9:30-12:30 PM AM

Peggys Cove, N.S. - massive granite
boulders, much sea weed 3 sp
Littorina + Thais feeding on
bed of mytilus.

Salinity 31 ‰

JR-10-81 11: - 12 PM 25 Aug 1981

Prim Point, Bayview N.S. —
NE of Digby at Govt Lighthouse

h. sax & h. lit from granite
boulders

JR-11-81 1:30 - 2:30 PM 25 Aug 1981

Provincial
Savory Park, just W. of
Barton, N.S. (Pierin ova)

rocky shore, low tide 2:50 PM.

L. lit, obtusid, sax, Thais
— no lg boulders — few rapetia sp.
density 32000
on 2 lg ova.

JR-12-81 3-4 PM Aug 25, 1981

Port Maitland, N of Yarmouth
N.S. boulders at base of
fishing pier

JR-13-81 10:30-11:30 AM 26 Aug 1981

"Sand Beach" just S. of
Yarmouth, N.S.

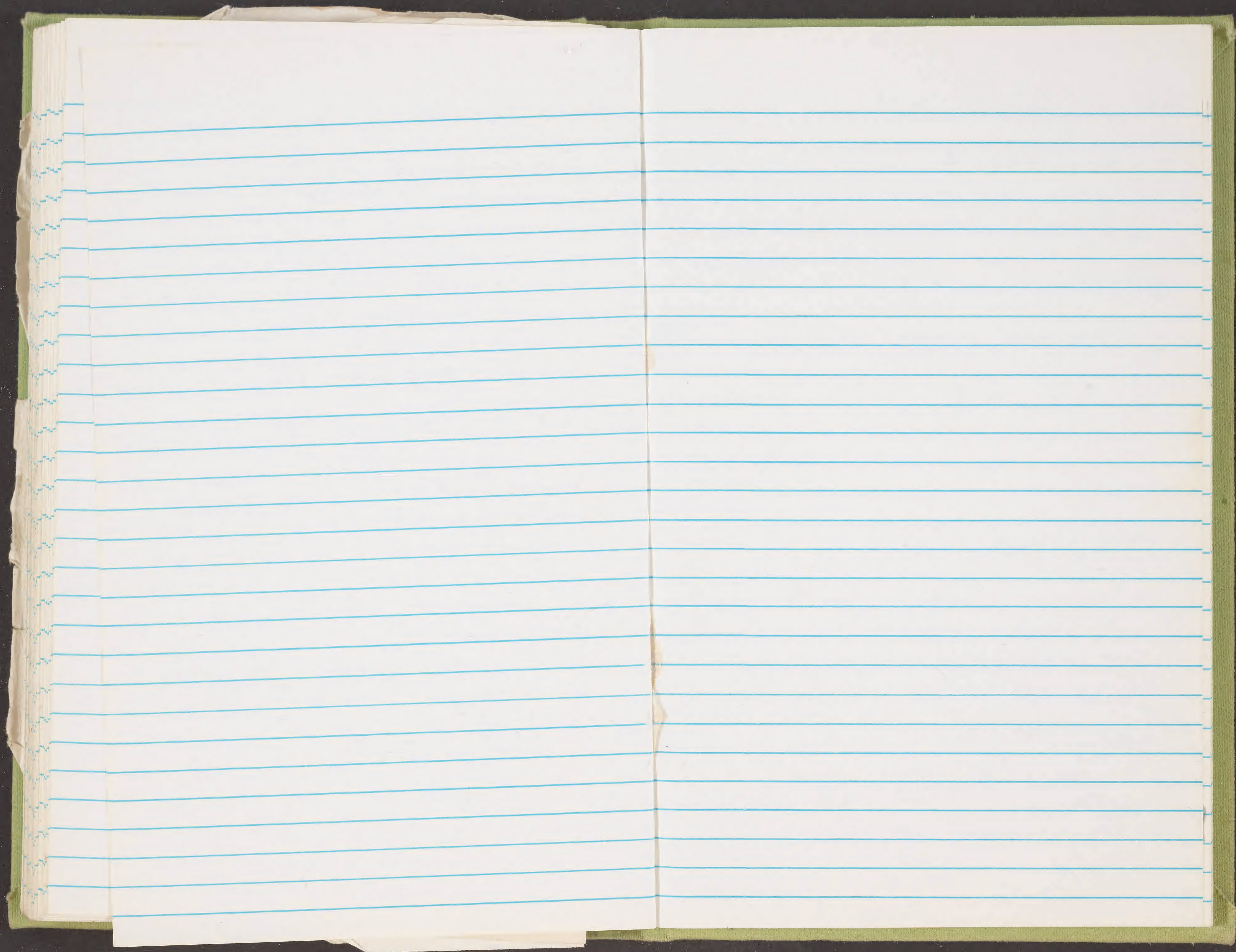
L. litt & L. sax on
rocks at low tide
sax lower than usual.

Wait for Ferry from Yarmouth to ~~Bar~~ ^{Beaver} Harbor

JR-14-81 2:30-4:00 PM 27 Aug 1981

Moose Point State Park, between
Seaside (just SW) & Belfort, Me.
Low tide at 1350 \pm - Littorina litt
obscure on rocks & weed. L. saxatilis
only \pm under rocks at high tide here -
shore does not have many large
boulders high up & the may
be reason for their distr. low.

Salinity 26‰



JR-15-81 4:15-5:00 PM Aug 27, 1981

Camden Hills St. Park, near
Camden, Maine - rocky
shore + cliffs. *L. saxatilis*
+ *Littorina* near highest
point above sea level in
creeks

JR-16-81 2:30-4:00 PM Aug 28, 1981

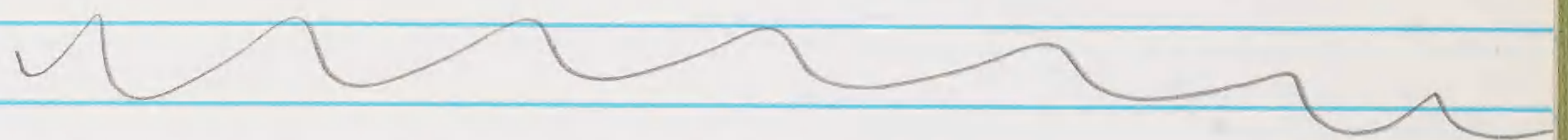
Sea Point, Witter, Maine -
L. littorea, *L. saxatilis* These on
rocks during descending tide (low
tide at 16:58. Note: *L. saxatilis*
found with heavy green seaweed
on highest rocks - but smoother
but rough form over all over
rocks at tide line of descending
tide or low or Thalassia - Thalassia

salinity 34.700

JR-17-81 5-600PM Aug 29, 1981

Nahant, Mass - at MSI, NEU.
Littorina from Balanus - neglected?
in vial of L. littorea + Tham

Barometer 32.000 Temp 68°



JR-18-81

Nov. 14, 1981

Mamala Bay, Oahu

29-35 FATH Sand + Pinnā

21° 17.4' N; 157° 54.9' W

Burch Sta 81085

Dredging - JANTHINA VII.

J+M Rosewater, W. Thorson, ^{T.}Burch

JR-19-81

Nov. 14, 1981

Mamala Bay, Oahu

18-23 FATH SAND + Pinnā

21° 17.5' N, 157° 55' W.

Burch Sta 81086

Dredging JANTHINA VII

J+M Rosewater

W. Thorson

T. Burch

JR-20-81

Nov. 14, 1981

Mamala Bay, Oahu, Hawaii

21° 16.7' N. 157° 54.0' W

90-120 FATH SAND

Burch Sta. 81087

Dredging - JATHINA VII

J. & M. Rosewater, W. Thorson, T. Burch,

JR-21-81

Nov 18, 1981

Kaena Point State Park

N.W. Oahu, Hawaii

at end of paved road

shell sand from drift line

J. & M. Rosewater, E.A. Kay

J.R.-22-81

Nov. 18, 1981

Beach, Nanai Kapono School

Nothing kept
Beach rubble
Nana Kuli, W. Oahu, Hawaii

shell sand from drift line

M. & J. Rosewater, E.A. Kay

J.R.-23-81

Nov. 18, 1981

EWA Beach, S.W. Oahu, Hawaii

Nothing kept
Beach rubble
shell sand from drift line

M. & J. Rosewater, E.A. Kay.

